

Learning through simulation: A systematic literature review of the use of virtual reality and augmented reality in social work education

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Learning through simulation: A systematic literature review of the use of virtual reality and augmented reality in social work education

Virtual reality and augmented reality in social work education

(This is the accepted manuscript before the typesetter proofs)

Abstract

The use of virtual reality as a learning tool is becoming increasingly prevalent in social work education. This systematic review aims to analyze the findings of studies that have applied virtual reality to social work training through thematic and content analyses. Our results show that the main advantages of virtual reality for social work training cited in the literature include improvements in motivation, and the acquisition of competencies and skills specific to the discipline of social work (assessment, diagnosis, and intervention), among others. The main limitations include temporal constraints in the application of virtual reality, as well as perceived dehumanization.

Keywords

Educational training; virtual reality; augmented reality; educational simulations; social work education; professional skills

Introduction

Emerging technologies constantly alter people's daily lives, including the way in which they search for information, interact with and generate content, and solve daily problems (Aarts and Marzano, 2003). Likewise, technology offers greater benefits and possibilities in the field of education, and in the transmission of knowledge, compared to traditional methods (López-Belmonte et al., 2019). In line with this, technologies such as virtual reality (VR) and augmented reality (AR) are having a growing impact on the field of education and, especially, higher education (Moreno and Leiva, 2017). For example, VR and AR can complement theoretical lectures by providing immersive, hands-on virtual experiences that can increase students' learning motivation (Khan et al., 2019). In this manner, virtual environments can become "safe spaces" in which students are immersed, and can make mistakes and hone or practice skills learnt in the classroom before using them in real life; they can develop skills that are difficult to acquire and apply in real environments due to time constraints (Lanzieri et al., 2021).

Specifically, education in the field of social work (SW) is increasingly incorporating VR as a learning system with the aim of immersing students in different situations and experiences directly practiced in the classroom (Trahan et al., 2017). Virtual worlds in SW education promote greater understanding of the skills and values specific to this discipline, such as the importance of social relationships, empathy and understanding discrimination (Vernon et al., 2009).

In addition, virtual environments provide SW students with other benefits, such as enhanced self-reflection, critical thinking, risk-taking, creative problem-solving and teamwork (Reinsmith-Jones et al., 2015). Other

authors, such as Levine and Hope (2013), stated that VR is an effective tool for developing case management skills for SW students. Advantages of these virtual systems include the opportunity to experience multiple scenarios that might rarely be encountered in real-world field practice (Washburn and Zhou, 2018).

Successful practical application of VR and immersive virtual environments in SW interventions involving different populations and groups with diverse needs has been observed, and improvements have been achieved in their quality of life. In particular, VR has been applied for social interventions in cases of dementia (Strong, 2020), and to improve the social skills of children with autism spectrum disorder (Ke et al., 2020) and promote the emotional and social well-being of elderly people (Montana et al., 2020). In this regard, the Australian Association of Social Workers (Agllias et al., 2010) pointed out that while it is of paramount importance to develop face-to-face interpersonal skills, the use of technologies and other innovative strategies is also necessary to promote knowledge, skills and standards for professional practice. These studies support and provide a framework for the use of VR for SW education and practice.

Other authors have pointed out that VR and AR environments are costly, difficult to set up and sometimes unreliable. In addition, students are generally assumed to be proficient in the use of digital technologies, but this is not always the case (Maples-Keller et al., 2017). The global coronavirus disease 2019 (COVID-19) pandemic has accelerated the process of transformation towards digital societies. SW has been affected by this process (Minguela-Recover et al., 2021); important changes have occurred in social interventions, and new strategies based on digital methods have been developed (Del Fresno, 2015). These new strategies include online research and interventions, as well as professional training through information communication technologies. In short, we are witnessing a historical transition in SW that justifies an up-to-date literature review.

Due to the equivocal results of studies of VR as a pedagogical system in SW, a systematic review of the research developed to date on this topic is necessary, including to identify global trends in this field. The present research aims to update the findings of a systematic review previously conducted on this phenomenon, in which only seven studies were included (Huttar and BrintzenhofeSzoc, 2019). Furthermore, this previous systematic review only included papers published up to 2016, making an update including the most recent papers essential. Therefore, the aim of the present systematic literature review is to compile and synthesise the available scientific evidence on the impact of VR on the professional competencies and skills training of undergraduate and postgraduate SW students. More specifically, our study aims to answer the following question: What are the potential benefits and/or limitations of using VR for SW training?

Material and Methods

Protocol Review Process

The methodological standards and guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) (Page et al., 2021) were implemented for this review, which was also guided by Chapters 5, 11, 20 and 22 of the Cochrane Handbook for Systematic Reviews of Interventions: Cochrane Book Series (Higgins et al., 2019) and Chapter 2 (Systematic reviews of qualitative evidence) of the JBI Manual for Evidence Synthesis (Lockwood et al., 2020). All steps in the review process were carried out by two independent authors. In cases of discrepant opinions, a third researcher with expertise in the field provided input (Thomas and Harden, 2008). The steps comprising the literature review process are detailed in Figure 1.

In this study, we considered the common characteristics shared by the suggestions for designing review protocols from PRISMA, the Cochrane Manual, and the JBI Manual. First, we defined a clear and specific research objective and question. Then, we developed a comprehensive search strategy and outlined inclusion and exclusion criteria. Subsequently, following the recommendations of these guides, we determined how the data analysis would be conducted. Finally, we synthesized the results of the included studies through a narrative approach to derive evidence-based conclusions and make recommendations. In summary, these protocols were implemented to ensure transparency, rigor, and overall quality in this systematic review.

Literature Search

To conduct this review, we searched the following databases: Web of Science, Scopus, APA PsycInfo (ProQuest) and Social Services Abstracts. In order to identify all potentially relevant articles, we also searched the reference lists of studies previously published in journals and conference abstracts/proceedings up to December 2022. Similarly, to broaden the searches, the titles of previously published systematic reviews were inserted into Google Scholar, and the "cited by" and "related articles" functions were used to detect other studies potentially of interest (Noruzi, 2005). The database search strategies were based on the three conditions of the PICO system, albeit that a more flexible approach was taken (Higgins et al., 2019): (1) for the population (SW undergraduates and postgraduate students pursuing related studies), we used "Train*, educat*, learn*, teach* and stud*" as the search terms; (2) for the intervention (digital and interactive interventions), we used "Virtual Reality, VR, augmented reality, AR and virtual world" as the search terms; (3) and for the study design, studies with highly diverse designs were selected. The conditions were linked with the Boolean operator "AND", while the keywords for each condition were linked with "OR". In this search strategy, no filters or restrictions (by language or method of accessing the documents) were applied so that the maximum amount of pertinent data could be collected, however, it should be noted that the search terms were all in English. The search strategies used for each database are shown in Table 1.

Table 1. Bibliographic search strategies.

Database	Search strategy
APA PsyInfo (ProQuest)	tiab(Train* OR educat* OR learn* OR teach* OR stud*) AND tiab("virtual reality" OR "VR" OR "augmented reality" OR "AR" OR "virtual world") AND tiab("social work")
Scopus	(TITLE-ABS-KEY (Train* OR educat* OR learn* OR teach* OR stud*) AND TITLE-ABS-KEY ("virtual reality" OR "VR" OR "augmented reality" OR "AR" OR "virtual world") AND TITLE-ABS-KEY ("social work"))
Web of Science (WOS)	((TS=(train* OR educat* OR learn* OR teach* OR stud*)) AND TS=("virtual reality" OR "VR" OR "augmented reality" OR "AR" OR "virtual world")) AND TS=("social work")
Social Services Abstracts	(train* OR educat* OR learn* OR teach* OR stud*) AND ("virtual Reality" OR "VR" OR "augmented reality" OR "AR" OR "virtual world") AND "social work"

Study Selection: Inclusion and Exclusion Criteria

Two authors working independently initially selected studies based on a review of the titles and abstracts of the records identified. A paper was screened in depth if at least one of the authors selected it based on its title or abstract. A third author intervened if there was reasonable doubt about the inclusion of any such study in the review. A study was included if it met the following inclusion criteria during the screening phase: (1) primary research studies; (2) type of paper: articles; (3) studies whose samples comprised SW or postgraduate students engaged in related studies; (4) research analysing the perceptions and impact of VR and/or AR on training and learning; and (5) articles published since 2012, i.e. the year identified by authors such as Cipresso et al. (2018) as that in which there was a widespread emergence of low-cost VR technology. The exclusion criteria were as follows: (1) secondary research (reviews); (2) documents published in other formats (conference proceedings, book chapters, letters, etc...); (3) and articles not providing data relevant to the objective of this review.

Proposed figure 1 position

Data Extraction

Two authors independently extracted data using an Excel (Microsoft Corp., Redmond, WA, USA) data extraction template designed based on the information presented in Chapter 2 (Systematic reviews of qualitative evidence) of the JBI Manual for Evidence Synthesis (more specifically, Appendix 2.3: JBI Qualitative data extraction tool; Lockwood et al., 2020). We extracted the general characteristics of the studies (authorship, year of publication, country, phenomenon of interest, methods of data collection and analysis), characteristics related to the participants (sample size, gender and target groups), characteristics related to the intervention (technology used ["software" or "computer system"] and physical technologies ["hardware": VR goggles, mobile devices, etc.]) and the results (description of the main findings).

Thematic Synthesis and Content Analysis

Although synthesising the available qualitative and quantitative evidence in a single review can create difficulties in terms of the evaluation and presentation of results, at the same time it offers greater possibilities to extend and generalise findings (Greenwood et al., 2015). In the present review, findings from qualitative and quantitative studies were combined and compared in order to achieve a better understanding of the research problem. We conducted a thematic synthesis to identify the main themes and sub-themes associated with research on VR as a tool for SW training, and to summarise the information presented in the studies. Based on the recommendations of Thomas and Harden (2008), we implemented a three-stage process: coding the text 'line by line'; developing 'descriptive themes'; and generating 'analytical themes'.

Finally, and following the approach of systematic reviews of knowledge-building (Finfgeld-Connett, 2014), we conducted a content analysis wherein data segments were identified, data matrices and coding were performed, and reflections were extracted. The EPPI-Reviewer software (version 4.13.0.2; Thomas et al., 2010) facilitated both the thematic synthesis and content analysis. Using this program, we generated a template to store, sort and group all of the information extracted from the included primary studies; this helped us to answer the research question and meet the study objectives.

Results

Study Selection Process

The PRISMA flowchart shows the results of the study selection process (Figure 2). A total of 1,564 documents were retrieved from the initial database searches, with a further 12 studies being retrieved from related sources. After removing duplicate records (n = 42), 124 studies were screened. Of these studies, 71 were excluded at the title/abstract screening stage, and a further 31 during full-text review. The reasons for excluding these articles are given in Figure 1. Finally, 22 studies were included in the present review.

Main Characteristics of the Included Studies

Supplementary Table S1 lists the main characteristics of the 22 studies included in this systematic literature review. All of these studies address issues related to the impact of VR/AR on SW training. The studies cover a period of 9 years (2013–2022). The included studies provide data from a total of 1,652 participants distributed across seven countries: the USA (n = 13), Australia (n = 2), Spain (n = 2), the UK (n = 1), Singapore (n = 1), China (n = 1) and Sweden (n = 2). Figure 3 provides a heat map clearly showing the global distribution of the collected publications.

Proposed figure 2 position

Proposed figure 3 position

With regard to the gender of the samples, among the studies in which it was specified, there were 209 males, 1,187 females and 4 non-binary persons are differentiated. Regarding educational level, 12 studies focused on undergraduate social work studies, while 8 included postgraduate social work programs and 2 included both.

In terms of the methodologies used in the selected articles, nine studies employed a qualitative methodology; five of these studies used the focus group technique (Egonsdotter et al., 2018; Egonsdotter and Bengtsson, 2022; Liaw et al., 2020; Tandy et al., 2017; Wilson et al., 2013), two used the interview technique (Boyle and Pham, 2019; Ferguson and Driver, 2019), one used the Delphi method (Vázquez-Cano et al., 2020) and one performed a survey (Roberson and Baker, 2021). However, 3 articles used a quantitative methodology (Minguela-Recover et al., 2022; O'Brien et al., 2019; Putney et al., 2019) and 10 employed a mixed method (Anstadt et al., 2016; Casey and Powell, 2022; Lanzieri et al., 2021; Lee, 2014; Levine and Hope, 2013; Li et al., 2019; Martin, 2016; Reinsmith-Jones et al., 2015; Smith et al. 2021; Washburn et al., 2016). The mixed methodology studies mainly used the survey data collection technique (n = 9), which in some cases was combined with focus group (n = 2), interview (n = 2) and Delphi method (n = 1) techniques.

Regarding the software packages used in the different studies, "Second Life" (Anstadt et al., 2016; Levine and Hope, 2013; Martin, 2016; Reinsmith-Jones et al., 2015; Tandy et al., 2017; Wilson et al., 2013), SIMmersion (O'Brien et al., 2019; Putney et al., 2019; Smith et al., 2021), SimChild (Egonsdotter et al., 2018; Egonsdotter and Bengtsson, 2022), eSimulation (Casey and Powell, 2022), Wonda VR (Lanzieri et al., 2021), Canvas 360 (Ferguson and Driver, 2019), iSWAPP (Minguela-Recover et al., 2022), Kognito (Boyle and Pham, 2019), Voki and Moodle (Lee, 2014), Unity 5 (Liaw et al., 2020) and Virtual Patient (Washburn et al., 2016) were employed. Other studies used multiple software packages, such as Vázquez-Cano et al. (2020), who used Anatomy 4D, Quiver, Chromville and Zookazam. Finally, one study obtained 360° recordings with a camera to create a VR environment (Roberson and Baker, 2021).

In respect of the hardware that the studies included in this review used to project VR and AR environments, personal computers were typically employed (Anstadt et al., 2016; Boyle and Pham, 2019; Casey and Powell, 2022; Egonsdotter and Bengtsson, 2022; Egonsdotter et al., 2018; Lee, 2014; Levine and Hope,

2013; O'Brien et al., 2019; Smith et al., 2021; Tandy et al., 2017; Washburn et al., 2016; Wilson et al., 2013), although VR goggles (Ferguson and Driver, 2019; Lanzieri et al., 2021; Li et al., 2019; Martin, 2016; Minguela-Recover et al., 2022; Roberson and Baker, 2021) and smartphones (Vázquez-Cano et al., 2020) were also used.

Findings of the thematic and content analysis

Based on the analysis, three central descriptive themes common among the papers included in this review were inductively developed. These thematic areas, which relate to the use of VR for SW student training, as well as analytical approaches, are detailed in Table 2.

Table 2. Primary findings of the thematic synthesis

Descriptive themes	Analytical approach
Potential of VR/AR for the acquisition of practical skills necessary for the correct application and development of SW techniques.	Interview technique Home visit technique Observation technique
Effectiveness of virtual worlds as motivational systems allowing the user to experience professional contexts and scenarios that are difficult to access and infrequently encountered in real life.	Potential of VR for training social workers Self-perceived advantages of VR for training social workers
Contribution of VR to the acquisition of professional and personal skills essential for the practice of SW.	VR for the acquisition and management of professional skills

Abbreviations: VR = virtual reality; AR = augmented reality; SW = social work

Note. The thematic synthesis, and the subsequent coding and content analysis, were carried out with the help of EPPI-Reviewer software (version 4.13.0.2).

Potential of virtual reality/augmented reality for the acquisition of the practical skills necessary for the correct application and development of social work techniques.

This section shows how VR can improve interviewing skills, home visit technique, and observation in SW students.

Interview technique

Casey and Powell (2022) highlight how VR provides an interview experience that would not occur outside the university context. Furthermore, several studies reported that this technology enabled students to improve their practical interviewing skills (Anstadt et al., 2016; Casey and Powell, 2022; Putney et al., 2019; Tandy et al., 2017), and to formulate questions in the interview setting (Boyle and Pham, 2019). In relation to the above, Washburn et al. (2016) found that students highlighted how these types of simulations helped them develop the skills needed to conduct brief clinical interviews in a unique way that enhanced their classroom performance and field work.

Tandy et al. (2017) emphasised that students were able to make mistakes during the interviews and try again without hurting a real person. Moreover, they appreciated how seemingly small changes in their responses had large effects on the interview outcomes.

Home visit technique

Minguela-Recover et al. (2022) and Wilson et al. (2013) focused on home visits in the virtual world. These authors highlight that the VR platform gives students the opportunity to understand the types of skills needed for conducting home visits and helps them to anticipate the unforeseen situations that can arise in these environments, and how they might respond. Furthermore, participation in the simulation exercise raised students' awareness of the challenges associated with conducting home visits, including safety issues and managing personal biases, when conducting assessments in people's homes. Similarly, these authors noted that the simulation made students aware of aspects of service users that they could appreciate in their homes but are not accessible in office settings. The teachers who participated in this study felt that the simulation helped students understand the service users' circumstances and the resources available to them. They also appreciated that participation in this simulation gave students more confidence in their ability to conduct home visits (Minguela-Recover et al., 2022; Wilson et al., 2013).

Observation technique

Within the home visit framework, Anstadt et al. (2016), Ferguson and Driver (2019) and Wilson et al. (2013) emphasise that the VR system has positive effects on students' observational skills and visual efficiency. Furthermore, the virtual experience provided to students in the study of Minguela-Recover et al. (2022) allowed for training in observation, which, according to the participants, is crucial for obtaining information, as well as for formulating, orienting and objectively evaluating user dependency.

Similarly, during the role-play in Levine and Hope (2013) study, students had the opportunity to communicate in real time while observing the body language of their avatars, which is a fundamental aspect in the professional practice of SW. Along these lines, Roberson and Baker, 2021 stated that the students in their study were able to appreciate the analysis context, as well as aspects of the verbal and non-verbal communication of the virtual participants.

Effectiveness of the virtual world as a motivational system for familiarisation with professional contexts and scenarios that are difficult to access and infrequently encountered in real life.

VR technologies are exciting and motivational teaching tools for students that facilitate the approach to hard-to-reach spaces and the practice of skills while avoiding exposure to risks that can occur in real situations.

Impact of virtual reality on the training of social workers

VR enables students to experience potentially dangerous professional scenarios (Li et al., 2019) and situations that are infrequently encountered, and difficult to cope with, in reality (Egonsdotter et al., 2018; Tandy et al. 2017; Roberson and Baker, 2021; Vázquez-Cano et al., 2020). Although virtual spaces are not intended to create accurate models of professional contexts, nor to replace them with simulated experiences (Egonsdotter et al., 2018), their usefulness for learning practical SW concepts, and as a complement to theoretical learning, is evident (Lanzieri et al., 2021; Minguela-Recover et al., 2022).

Self-perceived advantages of virtual reality for the training of social workers

The main strengths of virtual simulations identified by participants in different studies (Casey and Powell, 2022; Lanzieri et al., 2021; Lee, 2014; Martin, 2016) were novelty, stimulation and fun, communication with the characters, and the provision of an exciting and motivating environment; these factors led to a preference among the students for this interaction modality over more stressful face-to-face interactions. Similar to Tandy et al. (2017), authors such as Vázquez-Cano et al. (2020) reported that their students considered VR to provide stimulating, proactive and interactive educational scenarios. Moreover, VR systems have been praised for their authenticity and ability to motivate SW students (Egonsdotter and Bengtsson, 2022).

In relation to the above, the students in several studies (Casey and Powell, 2022; Lee, 2014; Minguela-Recover et al. 2022; Washburn et al., 2016; Wilson et al., 2013) stated that VR makes it possible to practice professional skills without the risk of making a mistake with a real person, thus constituting a safe and controlled experience.

Virtual reality for the acquisition and management of professional skills essential for the professional practice of social work

Professional and personal skills such as empathy, active listening, cultural awareness, and those related to interpersonal communication can be enhanced through VR training, which also facilitates the identification of biases and prejudices in SW students.

Virtual reality for the acquisition and management of professional skills

Boyle and Pham (2019); Ferguson and Driver (2019); Egonsdotter and Bengtsson (2022); Lee (2014); Levine and Hope (2013) and Reinsmith-Jones et al. (2015) noted improvements in students' empathy skills after participating in the virtual simulation. The immersive virtual training system allowed students to reflect on how their own beliefs and biases may affect their SW practice, and thus enhanced their cultural awareness (Egonsdotter et al., 2018; Egonsdotter and Bengtsson, 2022). Along these lines, some students in the studies of Lee (2014) and Wilson et al. (2013) noted that the VR experience helped them appreciate some of their own biases and stereotyped beliefs during virtual training. Relatedly, VR can increase students' motivation to learn about social diversity (Anstadt et al., 2016; Lee, 2014).

Other skills enhanced by VR training include active listening. Levine and Hope (2013) and Minguela-Recover et al. (2022) noted that students showed greater mastery of active listening skills, were confident in providing feedback to service users, responded empathically to clients, included their clients in all aspects of the intervention, and inquired about their opinions and feelings. However, Martin (2016) reported that the use of the VR platform did not improve students' interpersonal communication skills.

Other authors (Anstadt et al., 2016; Levine and Hope, 2013; and Li et al., 2019) noted that students reported feeling more confident about a variety of basic tasks related to case management and handling. Moreover, Boyle and Pham (2019), Putney et al. (2019), Roberson and Baker (2021), Smith et al. (2021), Washburn et al. (2016) and Wilson et al. (2013) noted improvements in assessment, diagnostic and intervention skills. However, some studies, such as that of O'Brien et al. (2019), contradict the findings presented above, reporting that immersive virtual experiences did not enhance the detection, intervention or referral skills of SW students.

Other skills enhanced through VR simulations include leadership and advocacy (Boyle and Pham, 2019); furthermore, understanding of interdisciplinary working and the holistic approach professionals take when working in an interdisciplinary team was enhanced (Liaw et al., 2020).

Discussion

This systematic review has highlighted some of the most notable aspects of the use of VR for training undergraduate and postgraduate students in SW. Specifically, our results show the potential of VR as a technological resource promoting the acquisition of practical, technical, professional and personal skills, as well as providing motivation for didactic transposition.

In line with the results of previous systematic reviews (Huttar and BrintzenhofeSzoc, 2019), the 22 articles included in the present review reported overall positive outcomes of learning supported by VR and AR resources. However, our systematic review stands out because it was performed after the educational transformation that resulted from the COVID-19 pandemic. More specifically, among the benefits of the use of these systems for training purposes, our findings highlight that they can: (1) increase motivation, interaction and dynamism; (2) improve the acquisition of SW competencies and skills relating to assessment, diagnosis and intervention; (3) provide training in specific techniques; (4) promote the acquisition of personal skills linked to good professional practice (i.e. observational, assessment-related, empathic, affective, active listening and communication skills); (5) improve the self-detection of prejudices; (6) allow for familiarisation of environments/contexts and groups that are difficult to access; and (7) provide an opportunity to improve skills through trial and error tests in a controlled environment.

Although more evidence is still required regarding the impact of different VR-mediated learning activities on SW students' acquisition of competencies and skills, many of these simulations have already demonstrated high acceptability and usability (Smith et al., 2021; Wilson et al., 2013). However, as our results show, the shift towards digital SW education has not been made without difficulties. Ethical issues are perhaps among the most relevant, and are certainly among the most challenging, problems for the

discipline. Technology-based SW methods and approaches have the potential to be operated in ways that exacerbate power disparities, which could lead to oppression (socio-technical injustices) (Taylor-Beswick, 2023). It is essential to guarantee equal access to these methods for all learners, and to remove any barriers to their use. In this sense, there is scientific evidence of the positive effects of this type of training for students varying in intelligence and/or functional capacity (Krajčovič et al., 2022). The application of technology to train future professionals, or to aid the practice of existing professionals, requires constant expert review of multiple sources of information, such as studies published in this field, association guidelines, and national legislation, as well as professional supervision in order to ensure safe and ethical practice when adopting technology (Pascoe, 2021).

In line with the findings of Akçayır and Akçayır (2017) regarding the advantages and challenges associated with the use of VR/AR for education, our results show that contradictory conclusions may still emerge in relation to the use of these systems. Some studies found that VR/AR technology decreased cognitive load, while others reported an increase in cognitive load. Similarly, and as also mentioned in previous research (Kavanagh et al., 2017), although the main challenge reported in many of the studies analysed herein relates to the usability of these technologies, their ease of use is also frequently cited as an advantage. Some of the widely recognised difficulties associated with their use include the long training time required prior to their use, high economic costs, hardware and software usability problems, the lack of feedback, storage problems, image and sound quality problems and, finally, the difficulty of validation (Al Farsi et al., 2021).

Although a systematic review on the use of VR and AR for SW training was published in 2020 (Huttar and BrintzenhofeSzoc, 2019), in this study we applied a temporal restriction, i.e. “articles published between 2022 and 2016”. Therefore, due to the recent trend toward the use of these systems in higher education, the number of articles included in the present review is considerably higher, such that it represents an advance in our knowledge and provides a more up-to-date perspective.

This study provides a detailed synthesis of the main contributions and limitations of VR and AR systems for SW training. Our findings may provide guidance for future efforts to assess the suitability of these systems for practitioners and academics working in the field of SW. Similarly, by highlighting some of the barriers to the use of these systems for SW training, this study could guide specialists aiming to develop and implement advanced AR/VR technologies. The ultimate aim is to realise VR and AR applications that enhance the teaching-learning process in the specific domain of SW, and promote interdisciplinary collaborations.

Thus, this progressive inclusion and acceptance of VR and AR in the SW field require debates due to its implications for practice, policy, education, and research, to generate new approaches in line with the standards of the profession and adherence to its ethical principles and values (Vernon, 2022). In line with the ideas of Pink et al. (2022), we consider that it is crucial to offer insights such as those presented in this review, to establish new reference frameworks for practice and training in digital social work. This approach will allow social workers to assess when and how digital media, including VR and AR technologies, can be useful in their professional intervention and support their decision-making.

Following the contributions of Trahan et al. (2019), this review evidences how VR can support several of the broad purposes of SW by providing new forms of intervention, education, and awareness-raising. By understanding the application of VR, social workers can harness its potential to promote equality and social justice, improve health and well-being, strengthen family relationships, address violence, and promote environmental sustainability (American Academy of Social Work and Social Welfare, 2018).

In this regard, future research could continue to expand on the findings to generate a more robust body of knowledge, enabling social workers to develop the necessary skills and make informed ethical decisions when using VR in their professional practice. This new evidence could serve as guidance for the Social Workers' Ethical Responsibilities in Practice Settings (National Association of Social Workers, 2021), as well as for standards 4.01: Use of Technology in Social Work Education and 4.02: Training Social Workers about the Use of Technology in Practice (National Association of Social Workers, Association of Social Work Boards, Council on Social Work Education and Clinical Social Work Association, 2017). Current technology policy and many normative regulations have not kept pace with technological advances (Mathiyazhagan et al., 2022). Our study evidences the usefulness of these new didactic technological tools in SW training; however, more substantial evidence is needed.

This systematic review is not without limitations. One limitation relates to the exclusion of articles that included keywords in the text, but not in the abstract or title. Although the main databases containing studies on the topic of interest were searched, searching other databases may have revealed relevant scientific articles published in lower-impact journals. In addition, the key terms used to perform the searches were all in English; therefore, although we did not exclude studies on the basis of language, it is possible that some pertinent research may have been omitted. In other words, there was a risk of publication bias.

Conclusions

In conclusion, virtual environments are having a growing impact on the professional practice of SW, as well as education therefor at both the undergraduate and postgraduate level. Furthermore, there is a need to modify university undergraduate and postgraduate degree programs, as well as the training and continuing education of graduates and active social workers, such that they incorporate simulations and virtual environments given that most studies point out their benefits. Any such modifications must be based on up-to-date scientific evidence supporting the use of these virtual systems, the limitations of which must be overcome to realise their potential. To overcome the limitations pointed out by previous studies, such research should also focus on the ethics of SW. Finally, it is essential to emphasize the positive effects of VR and AR not only for the student body as a whole, but also for atypical students in particular.

References

- Aarts E and Marzano S (2003) *The New Everyday: Views on Ambient Intelligence*. Rotterdam: 010 Publishers.
- Akçayır M and Akçayır G (2017) Advantages and challenges associated with augmented reality for education: A systematic review of the literature. *Educational Research Review* 20: 1-11.
- Anstadt SP, Bruster B and Girimurugan SB (2016) Using virtual world simulators (Second Life) in social work course assignments. *International Journal of Learning Technology* 11(1): 66-90.
- Agllias K, Bowles W, Cassano B et al (2010) *A guide to supervision in social work field education*. Sydney: Australian Learning and Teaching Council.
- Al Farsi G, Yusof A, Fauzi W et al (2021) The Practicality of Virtual Reality Applications in Education: Limitations and Recommendations. *Journal of Hunan University Natural Sciences* 48(7): 142-155.
- Boyle S and Pham T (2019) The Innovative Integration of SBIRT raining Using Standardized Clients and Computer Simulation in Social Work Education. *European Journal of Education* 2(2): 50-56.
- Casey S and Powell MB (2022) Usefulness of an e-Simulation in improving social work student knowledge of best-practice questions. *Social Work Education* 41(6): 1253-1271.
- Cipresso P, Giglioli IA, Raya M and Riva G (2018) The Past, Present, and Future of Virtual and Augmented Reality Research: A Network and Cluster Analysis of the Literature. *Frontiers in Psychology* 9: 1-20.
- Del Fresno M (2015) Connecting the Disconnected: Social Work and Social Network Analysis. A Methodological Approach to Identifying Network Peer Leaders. *Arbor* 191(771): 1-14.
- Egonsdotter G, Bengtsson S, Israelsson M and Borell K (2018) Child protection and cultural awareness: Simulation-based learning. *Journal of Ethnic & Cultural Diversity in Social Work* 29(5): 1-15.
- Egonsdotter G and Bengtsson S (2022) Reflections in Case-Based Learning: Experiences of Computer-Based Simulations in Social Work Education. *Journal of Social Work Education*: 1-13.
- Ferguson V and Driver P (2019) Digitising Experience: The Creation and Application of Immersive Simulations in the Context of Social Work Training. *The Journal of Practice Teaching and Learning* 16(1-2): 38-50.
- Finfgeld-Connett D (2014) Use of content analysis to conduct knowledge-building and theory-generating qualitative systematic reviews. *Qualitative Research* 14(3): 341-352.
- Greenwood N, Habibi R, Smith R and Manthorpe J (2015) Barriers to access and minority ethnic carers' satisfaction with social care services in the community: a systematic review of qualitative and quantitative literature. *Health & Social Care in the Community* 23(1): 64-78.
- Higgins JPT, Thomas J, Chandler J et al (2019) *Cochrane Handbook for Systematic Reviews of Interventions. 2nd Edition*. Chichester (UK): John Wiley & Sons.

- Huttar C and BrintzenhofeSzoc K (2019) Virtual Reality and Computer Simulation in Social Work Education: A Systematic Review. *Journal of Social Work Education* 56(1): 131-141.
- Kavanagh S, Luxton-Reilly A, Wuensche B and Plimmer B (2017) A systematic review of Virtual Reality in education. *Themes in Science and Technology Education* 10(2): 85-119.
- Ke F, Moon J and Sokolikj Z (2020) Virtual Reality–Based Social Skills Training for Children With Autism Spectrum Disorder. *Journal of Special Education Technology* 37(1): 49-62.
- Khan T, Johnston K and Ophoff J (2019) The Impact of an Augmented Reality Application on Learning Motivation of Students. *Advances in Human-Computer Interaction* 2019: 1-14.
- Krajčovič M, Gabajová G, Matys M, Furmannová B and Dulina L (2022) Virtual Reality as an Immersive Teaching Aid to Enhance the Connection between Education and Practice. *Sustainability* 14(15): 1-14.
- Lanzieri N, McAlpin E, Shilane D and Samelson H (2021) Virtual Reality: An Immersive Tool for Social Work Students to Interact with Community Environments. *Clinical Social Work Journal* 49(2): 207-219.
- Lee E (2014) Use of Avatars and a Virtual Community to Increase Cultural Competence. *Journal of Technology in Human Services* 32(1-2): 93-107.
- Levine J and Hope R (2013) Introducing Case Management to Students in a Virtual World: An Exploratory Study. *Journal of Teaching in Social Work* 33(4-5): 552-565.
- Li J, Tang J and Jia C (2019) Virtual offender: a pilot project on nurturing social work students' capacity to work with offenders. *China Journal of Social Work* 12(1): 56-69.
- Liaw S, Wu L, Soh S, Ringsted C, Lau T and Lim W (2020) Virtual Reality Simulation in Interprofessional Round Training for Health Care Students: A Qualitative Evaluation Study. *Clinical Simulation in Nursing* 45: 1-5.
- Lockwood C, Porritt K, Munn Z et al (2020) Chapter 2: Systematic reviews of qualitative evidence. In: Aromataris E and Munn Z (eds) *JBIManual for Evidence Synthesis*. Australia: JBI, pp. 22-70.
- López-Belmonte J, Pozo-Sánchez S and Del Pino-Espejo MJ (2019) Projection of the Flipped Learning Methodology in the Teaching Staff of Cross-Border Contexts. *Journal of New Approaches in Educational Research* 8(2): 184-200.
- Maples-Keller J, Bunnell B, Kim S, Rothbaum B (2017) The Use of Virtual Reality Technology in the Treatment of Anxiety and Other Psychiatric Disorders. *Harvard Review of Psychiatry* 25(3): 103-113.
- Martin J (2016) Virtual Worlds and Social Work Education. *Australian Social Work* 70(2): 197-208.
- Mathiyazhagan S, Salem M, Willis H and Patton DU (2022) Social work in metaverse: Addressing tech policy gaps for racial and mental health equity. *Internet Policy Review*.

- Minguela-Recover MA, Hernández P and Mota JM (2021) Home Visit Training in Social Work with Virtual Reality. *The Journal of Sociology & Social Welfare* 48(3): 53-73.
- Minguela-Recover MA, Munuera P, Baena-Pérez R and Mota-Macías JM (2022) The role of 360° virtual reality in social intervention: a further contribution to the theory-practice relationship of social work studies. *Social Work Education*: 1-21. DOI: 10.1080/02615479.2022.2115998
- Montana J, Matamala-Gomez M, Maisto M et al (2020) The Benefits of emotion Regulation Interventions in Virtual Reality for the Improvement of Wellbeing in Adults and Older Adults: A Systematic Review. *Journal of Clinical Medicine* 9(2): 1-22.
- Moreno N and Leiva J (2017) Experiencias formativas de uso didáctico de la realidad aumentada con alumnado del grado de educación primaria en la universidad de Málaga. *Revista de Educación Mediática y TIC, EDMETIC* 6(1): 81-104.
- National Association of Social Workers, Association of Social Work Boards, Council on Social Work Education and Clinical Social Work Association (2017) Standards for Technology in Social Work Practice. Available at: <https://www.socialworkers.org/Practice/NASW-Practice-Standards-Guidelines/Standards-for-Technology-in-Social-Work-Practice> (accessed 12 July 2023).
- National Association of Social Workers (2021) Code of Ethics. Available at: <https://www.socialworkers.org/About/Ethics/Code-of-Ethics/Code-of-Ethics-English> (accessed 12 July 2023).
- Noruzi A (2005) Google Scholar: The New Generation of Citation Indexes. *Libri* 55(4): 170-180.
- O'Brien KH, Putney JM, Collin CRR, Halmo RS and Cadet TJ (2019) Optimizing screening, brief intervention, and referral to treatment (SBIRT) training for nurses and social workers: Testing the added effect of online patient simulation. *Substance Abuse* 40(4): 484-488.
- Page MJ, McKenzie JE, Bossuyt PM et al (2021) Declaración PRISMA 2020: una guía actualizada para la publicación de revisiones sistemáticas. *Revista Española de Cardiología* 74(9): 790-799.
- Pascoe KM (2021) Considerations for integrating technology into social work practice: A content analysis of nine professional social work associations' Codes of Ethics. *International Social Work*: 1-15.
- Pink S, Ferguson H and Kelly L (2022) Digital social work: Conceptualising a hybrid anticipatory practice. *Qualitative Social Work* 21(2): 413-430.
- Putney JM, Levine AA, Collin CR, O'Brien KH, Mountain-Ray S and Cadet T (2019) Teaching Note—Implementation of Online Client Simulation to Train and Assess Screening and Brief Intervention Skills. *Journal of Social Work Education* 55(1): 194-201.
- Reinsmith-Jones K, Kibbe S, Crayton T, Campbell E (2015) Use of Second Life in Social Work Education: Virtual World Experiences and Their Effect on Students. *Journal of Social Work Education* 51(1): 90-108.

- Roberson CJ and Baker LR (2021) Designing and Implementing the Use of VR in Graduate Social Work Education for Clinical Practice. *Journal of Technology in Human Services* 39(3): 260-274.
- Smith MJ, Bornheimer LA, Li J et al (2021) Computerized Clinical Training Simulations with Virtual Clients Abusing Alcohol: Initial Feasibility, Acceptability, and Effectiveness. *Clinical Social Work Journal* 49(2): 184-196.
- Strong J (2020) Immersive Virtual Reality and Persons with Dementia: A Literature Review. *Journal of Gerontological Social Work* 63(3): 209-226.
- Tandy C, Vernon R and Lynch D (2017) Teaching Note—Teaching Student Interviewing Competencies Through Second Life. *Journal of Social Work Education* 53(1): 66-71.
- Taylor-Beswick AML (2023) Digitalizing social work education: preparing students to engage with twenty-first century practice need. *Social Work Education* 42(1): 44-64.
- Thomas J and Harden A (2008) Methods for the thematic synthesis of qualitative research in systematic reviews. *BMC Medical Research Methodology* 8(1): 1-10.
- Thomas J, Brunton J and Graziosi S (2010). *EPPI-Reviewer 4.0: software for research synthesis*. EPPI-Centre Software. London: Social Science Research Unit, Institute of Education.
- Trahan M, Smith S and Benton A (2017). A new era of ethics: The use of virtual reality interventions in social work ethics. *The International Journal of Continuing Social Work Education*, 20(2): 5-24.
- Vázquez-Cano E, Marín-Díaz V, Oyarvide WRV and López-Meneses E (2020) Use of Augmented Reality to Improve Specific and Transversal Competencies in Students. *International Journal of Learning, Teaching and Educational Research* 19(8): 393-408.
- Vernon R, Lewis L and Lynch D (2009) Virtual Worlds and Social Work Education: Potentials for “Second Life”. *Advances in Social Work* 10(2): 176-192.
- Vernon R (2022) Virtual Reality and Social Work. *Oxford Bibliographies in Social Work*. Epub ahead of print 12 January 2022. DOI: 10.1093/OBO/9780195389678-0309
- Washburn M, Bordnick P and Rizzo A (2016) A pilot feasibility study of virtual patient simulation to enhance social work students’ brief mental health assessment skills. *Social Work in Health Care* 55(9): 675-693.
- Washburn M and Zhou S (2018) Teaching Note—Technology-Enhanced Clinical Simulations: Tools for Practicing Clinical Skills in Online Social Work Programs. *Journal of Social Work Education* 54(3): 554-560.
- Wilson AB, Brown S, Wood ZB et al (2013) Teaching Direct Practice Skills Using Web-Based Simulations: Home Visiting in the Virtual World. *Journal of Teaching in Social Work* 33(4-5): 421-437.

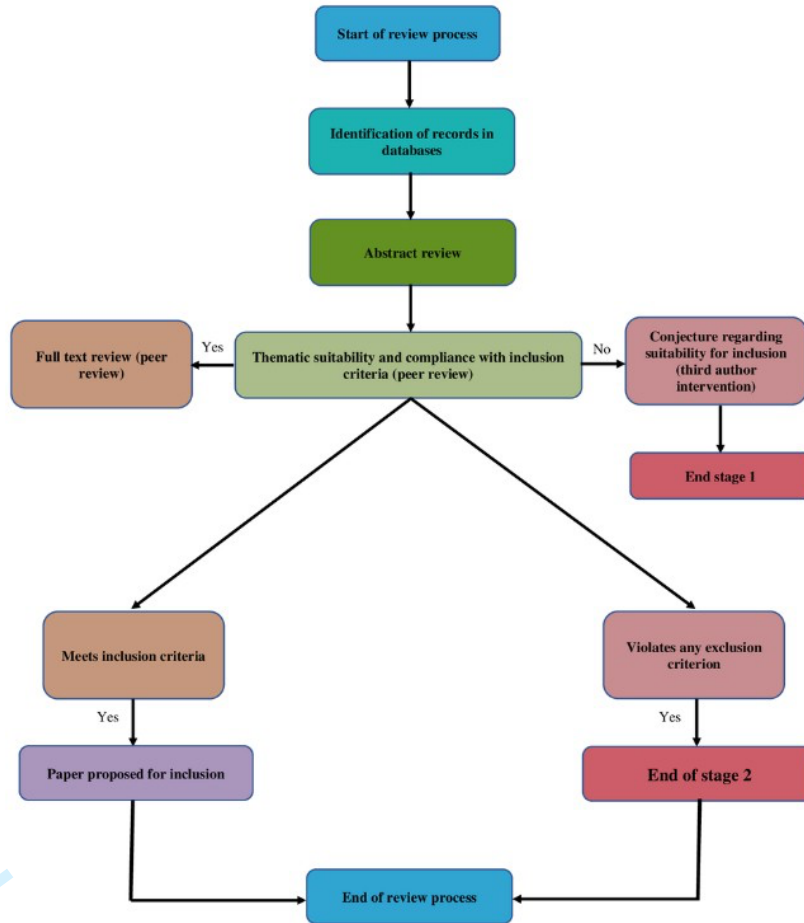
List of figures

Figure 1. Process flow for the literature review.

Figure 2. Adapted from PRISMA 2020 flow diagram (Page et al., 2021).

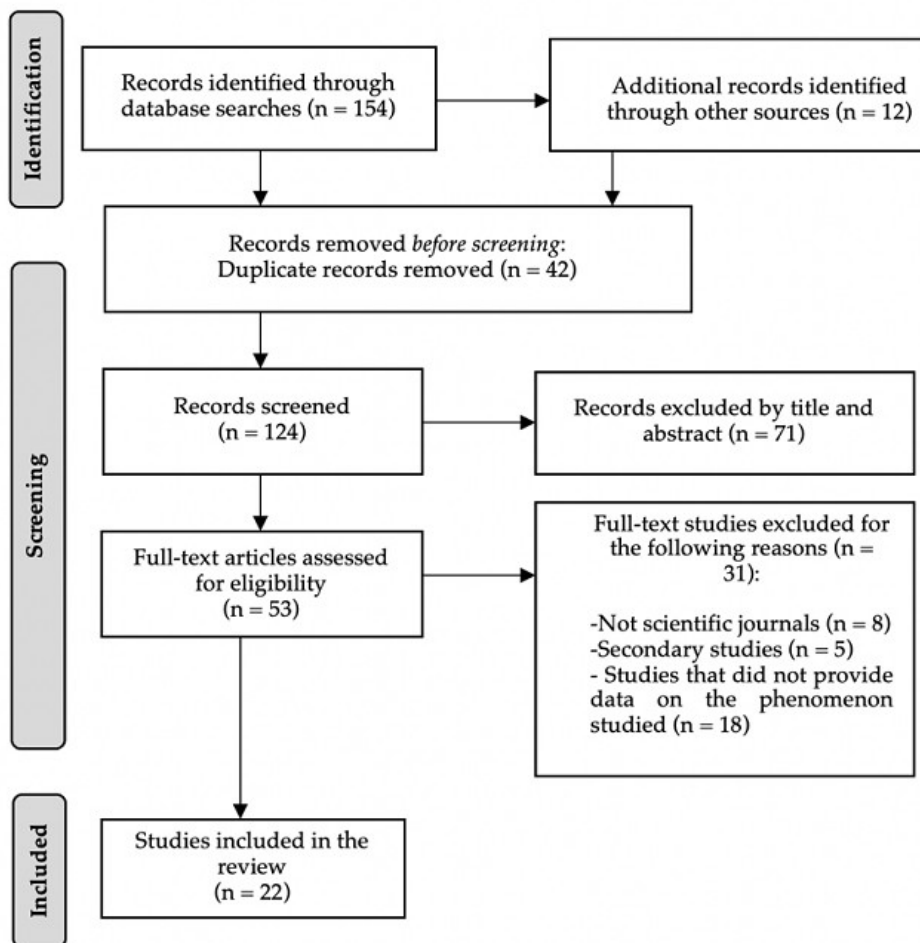
Figure 3. Worldwide geographic distribution of the included studies.

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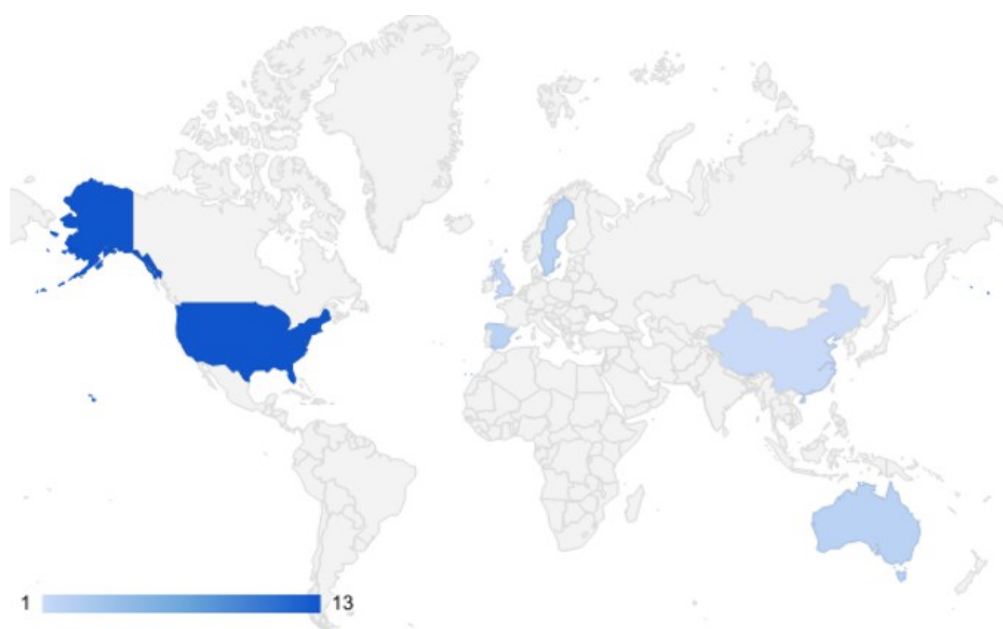


Accepted manuscript

Identification of studies via databases and registers



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